

Appl. No. 10/642,856  
Amdt. dated 9/19/06  
Reply to Office action of 6/19/06

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

On December 3, 2003, Applicants filed a claim for priority under 35 U.S.C. § 119 and a certified copy of German Patent Application 101 07 380.1, filed February 16, 2001. However, items 12), 12)a) and 12)a)1. of the Office Action Summary do not indicate receipt of those documents. Applicants would appreciate the Examiner's acknowledgement of receipt of the claim for priority and certified copy of the German Patent Application in the next Communication from the Office.

Claims 1, 2 and 4-7 are now in the application and are subject to examination. Claims 1, 2 and 4 have been amended and new claims 5-7 have been added. Claim 3 has been canceled.

In "Specification", item 1 on page 2 of the above-identified Office Action, the Examiner objected to the Specification. An appropriate correction of a typographical error on page 2 of the Specification has been made.

In "Drawings", item 2 on page 2 of the Office Action, the Drawings have been objected to as not containing a reference

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sign mentioned in the Specification. A typographical error on page 13 of the Specification has been corrected.

In "Claim Rejections - 35 USC § 112", item 4 on page 3 of the Office Action, claims 1-4 have been rejected as being indefinite under 35 USC § 112, second paragraph.

More specifically, the Examiner has stated that the term "temporally offset" is a relative term and therefore indefinite.

The term "temporally offset" is not relative. If the term had been, for example, a small temporal offset, it would have been relative. The Examiner should not confuse broad terminology with relative terminology. Nevertheless, the term no longer appears in the claims.

In "Claim Rejections - 35 USC § 102", item 6 on pages 4-5 of the Office Action, claims 1 and 2 have been rejected as being fully anticipated by U.S. Patent No. 6,509,621 to Nakoa under 35 U.S.C. § 102(e).

In "Claim Rejections - 35 USC § 103", item 8 on pages 5-7 of the Office Action, claims 3 and 4 have been rejected as being

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obvious over Nakoa in view of U.S. Patent No. 6,363,000 to  
Perner et al. (hereinafter Perner) under 35 U.S.C. § 103(a).

The rejections have been noted and the claims have been  
amended in an effort to even more clearly define the  
invention of the instant application.

The amendments to independent claims 1 and 4 are based on the  
description of the "half select" process mentioned on page 9,  
second paragraph and page 12, first paragraph of the  
Specification of the instant application.

The amendment to claim 2 is made to specify the successive  
order of the first to third rotation steps as described  
between page 12, second paragraph and page 13, first  
paragraph of the Specification of the instant application.

New claims 5, 6 and 7 are based on original claims 2 and 3.

Before discussing the prior art in detail, it is believed  
that a brief review of the invention as claimed, would be  
helpful. Claim 1 calls for, *inter alia*, a method for writing  
to magnetoresistive memory cells of an MRAM memory, the  
magnetoresistive memory cells having a multilayer system  
containing layers stacked one above another, the layers

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including a soft-magnetic layer, a hard-magnetic layer and a tunnel oxide layer disposed between the soft-magnetic layer and the hard-magnetic layer, which comprises the steps of:

impressing write currents being in each case impressed on a respective word line and a respective bit line resulting in a superposition of magnetic fields generated by the write currents, and in each selected memory cell selected by the respective word line and the respective bit line, a magnetic field leads to a change of a magnetization direction of only the soft-magnetic layer, the write currents being impressed on the respective word line and the respective bit line causing the magnetic field produced by the superposition of the magnetic fields of the word line current and a bit line current to be precisely large enough to suffice for switching the magnetization of the soft magnetic layer in the selected memory cell but small enough that neither adjacent cells nor cells situated on the selected lines are switched, the timings of the impression of both the word line current and the bit line current being exactly controlled so that the conventional switching of the soft magnetic layer of the selected memory cell is transferred into a magnetization rotation process rotating said magnetization direction of the soft magnetic layer in a plurality of successive steps in a direction desired for writing a logic "0" or "1".

Independent claim 4 calls for, *inter alia*, a n MRAM memory configuration, comprising:

an array containing magnetoresistive memory cells each having a multilayer system with layers stacked one above another, said layers including a soft-magnetic layer, a hard-magnetic layer, and a tunnel oxide layer disposed between said soft-magnetic layer and said hard-magnetic layer;

word lines;

bits lines crossing said word lines at each of said magnetoresistive memory cells; and

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a writing control circuit for impressing write currents in each case onto a respective word line and a respective bit line of a respective memory cell selected for writing, said writing control circuit having a write circuit for impressing the write currents in each case on said respective word line and said respective bit line causing the magnetic field produced by the superposition of the magnetic fields of the word line current and a bit line current to be precisely large enough to suffice for rotating the magnetization of the soft magnetic layer in the selected memory cell but small enough that neither adjacent cells nor cells situated on the selected lines are switched, said write circuit controlling the timings of the impression of both said word line current and said bit line current exactly causing the conventional switching of the soft magnetic layer of the selected memory cell to be transferred into a magnetization rotation process with only the soft magnetic layer of the respective memory cell being rotated in a plurality of successive steps in a direction desired for writing a logic "0" or "1".

The Nakao reference does not teach the method for writing to magnetoresistive memory cells as recited in claim 1 nor the MRAM memory configuration of claim 4, of the instant application, as amended.

Figs. 7 to 9 and in particular Fig. 9A, 9B, and 9D and the description thereof in column 9, line 11 to column 10, line 53 of Nakao clearly show that the method of Nakao requires an offset magnetic field  $H_y$  applied offset externally to the MRAM array, such as for example shown in Fig. 3B (referring to Fig. 7) and that the currents  $I_{wx}$  and  $I_{wy}$  are respectively impressed at the same time to the word line and the bit line and have the same magnitude of 1 mA (see Fig. 9B and Fig. 9D)

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of Nakao.

Therefore, the teachings of Nakao are quite different from the wording of claims 1 and 4 as quoted above. It is therefore believed that method claims 1 and 2 are not anticipated by Nakao.

The Perner reference does not make up for the deficiencies of Nakao, besides the fact that claims 2 and 5-7 are all ultimately dependent on claim 1 and therefore believed to be allowable.

Clearly, neither Nakao nor Perner show or suggest the steps and features recited in claims 1 and 4 of the instant application.

Not only are claims 1 and 4 believed to be patentable over Nakao and Perner, but it should be noted that claims with the wording of amended claims 1 and 4 have been regarded as being patentable in the parallel European application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1 and 4. Claims 1 and 4 are, therefore, believed to be patentable over the art.

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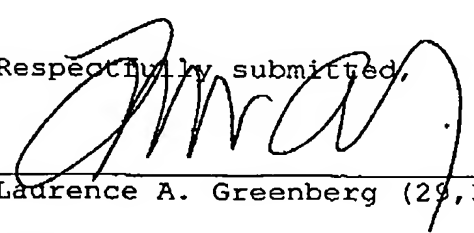
The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 1.

In view of the foregoing, reconsideration and allowance of claims 1, 2 and 4-7 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that patentable language can be worked out.

If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to Deposit Account Number 12-1099 of Lerner Greenberg Sterner LLP. Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to Deposit Account Number 12-1099 as well.

Respectfully submitted,



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LAG/bb

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